

We claim:

1. A process for preparing a support for catalysts, which comprises:
  - a) preparing a hydrogel;
  - 5 b) milling the hydrogel to give a finely particulate hydrogel;
  - c) producing a slurry based on the finely particulate hydrogel;
  - d) drying the slurry comprising the finely particulate hydrogel to give the support for catalysts,

wherein a finely particulate hydrogel in which

10 - at least 5% by volume of the particles, based on the total volume of the particles, have a particle size in the range from  $> 0 \mu\text{m}$  to  $\leq 3 \mu\text{m}$ ; and/or

- at least 40% by volume of the particles, based on the total volume of the particles, have a particle size in the range from  $> 0 \mu\text{m}$  to  $\leq 12 \mu\text{m}$ , and/or

- at least 75% by volume of the particles, based on the total volume of the particles, have a particle size in the range from  $> 0 \mu\text{m}$  to  $\leq 35 \mu\text{m}$ ,

15 is produced in step b).

2. A process for preparing a support for catalysts as claimed in claim 1, wherein a hydrogel in which at least 90% by volume of the hydrogel particles, based on the total volume of the particles, have a particle size in the range from  $> 0 \mu\text{m}$  to  $\leq 35 \mu\text{m}$  is produced in step b).

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3. A process for preparing a support for catalysts as claimed in claim 1 or 2, wherein the finely particulate hydrogel produced in step b) has a solids content in the range from > 0% by weight to  $\leq 25\%$  by weight, preferably in the range from 8% by weight to 13% by weight, more preferably in the range from 9% by weight to 12% by weight, calculated as oxide.

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4. A process for preparing a support for catalysts as claimed in any of the preceding claims, wherein a finely particulate hydrogel in which at least 40% by volume, preferably at least 50% by volume, of the hydrogel particles, based on the total volume of the particles, have a particle size in the range from  $> 0 \mu\text{m}$  to  $\leq 10 \mu\text{m}$  is produced in step b).

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5. A process for preparing a support for catalysts as claimed in any of the preceding claims, wherein a finely particulate hydrogel in which at least 10% by volume of the hydrogel particles, based on the total volume of the particles, have a particle size in the range from  $> 0 \mu\text{m}$  to  $\leq 2.8 \mu\text{m}$ , preferably in the range from  $> 0 \mu\text{m}$  to  $\leq 2.5 \mu\text{m}$ , is produced in step b).

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6. A process for preparing a support for catalysts as claimed in any of the preceding claims, wherein inorganic hydroxides, oxide-hydroxides, oxides and/or salts, preferably selected from the group consisting of  $\text{SiO}_2$ ,  $\text{Al}_2\text{O}_3$ ,  $\text{MgO}$ ,  $\text{AlPO}_4$ ,  $\text{TiO}_2$ ,  $\text{ZrO}_2$ ,  $\text{Cr}_2\text{O}_3$  and mixtures thereof, are added to the hydrogel in step b) and/or the slurry in step c).

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7. A process for preparing a support for catalysts as claimed in any of the preceding claims, wherein inorganic hydroxides, oxide-hydroxides, oxides and/or salts are added to the hydrogel in step b) and/or the slurry in step c) in an amount of  $\leq 10\%$  by weight, preferably  $\leq 5\%$  by weight, particularly preferably  $\leq 2\%$  by weight, based on the total solids content.

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8. A process for preparing a support for catalysts as claimed in any of the preceding claims, wherein  $\text{AlOOH}$  is added to the hydrogel in step b) and/or the slurry in step c) in an amount of from 1% by weight to 30% by weight, preferably from 5% by weight to 20% by weight, based on the total solids content.

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9. A process for preparing a support for catalysts as claimed in any of the preceding claims, wherein compounds of alkaline earth metals, preferably selected from the group consisting of  $\text{Ca}(\text{OH})_2$  and  $\text{Mg}(\text{OH})_2$ , are added to the hydrogel in step b) and/or the slurry in step c) in an amount of from 1% by weight to 10% by weight, particularly preferably from 2% by weight to 4% by weight, based on the total solids content.

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10. A process for preparing a support for catalysts as claimed in any of the preceding claims, wherein hydroxyl methyl cellulose is added to the hydrogel in step b) and/or the slurry in step c) in an amount of from 0.1% by weight to 10% by weight, particularly preferably from 1% by weight to 2% by weight, based on the total solids content.

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11. A process for preparing a support for catalysts as claimed in any of the preceding claims, wherein the solids content of the slurry is set to  $\leq 20\%$  by weight, preferably  $\leq 15\%$  by weight, particularly preferably  $\leq 10\%$  by weight, very particularly preferably in the range from 8% by weight to 10% by weight, based on the total weight, in step c).

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12. A process for preparing a support for catalysts as claimed in any of the preceding claims, wherein drying of the slurry comprising the finely particulate hydrogel is carried out by means of spray drying.

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13. A process for preparing a support for catalysts as claimed in any of the preceding claims, wherein  $\leq 5\%$  by volume, preferably  $\leq 2\%$  by volume, of the support particles obtained after drying have a particle size in the range from  $> 0 \mu\text{m}$  to  $\leq 25 \mu\text{m}$ , based on the total volume of the particles.

14. A process for preparing a support for catalysts as claimed in any of the preceding claims, wherein the support particles produced after drying have a mean particle size in the range from 1  $\mu\text{m}$  to 350  $\mu\text{m}$ , preferably in the range from 30  $\mu\text{m}$  to 150  $\mu\text{m}$  and particularly preferably in the range from 40  $\mu\text{m}$  to 100  $\mu\text{m}$ .  
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15. A support for catalysts which can be prepared as claimed in any of the preceding claims.
16. A support for catalysts as claimed in claim 15, wherein the silicon content of the support is  $\geq 10\%$  by weight, preferably  $\geq 25\%$  by weight, particularly preferably  $\geq 30\%$  by weight, very particularly preferably  $\geq 50\%$  by weight, based on the total weight of the support.  
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17. A support for catalysts as claimed in claim 15 or 16, wherein the aluminum content of the support is  $\geq 10\%$  by weight, preferably  $\geq 25\%$  by weight, particularly preferably  $\geq 30\%$  by weight and very particularly preferably  $\geq 50\%$  by weight, based on the total weight of the support.  
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18. The use of a support for catalysts as claimed in any of claims 15 to 17 as catalyst.
- 20 19. The use of a support for catalysts as claimed in any of claims 15 to 17 for preparing supported catalysts for the polymerization and/or copolymerization of olefins.